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ABSTRACT

This study investigated the efficacy of using inoculation theory in developing students' skills in resisting pressures involved with drinking and driving situations. Inoculation theory stems from psychosocial investigations that have demonstrated that resistance to specific opposing arguments can be increased if subjects are familiar with these arguments. The study sample was comprised of 155 ninth grade students who participated in instructional sessions that included films, question-answer sessions, role-play exercises, and a slide show. Each of these sessions familiarized students with physiological effects of alcohol and persuasive arguments people use to convince others to engage in risky alcohol-related practices (i.e., riding with drinking drivers). Role-play exercises taught students the content and aim of these persuasive arguments, gave them practice in refuting such arguments, and provided feedback on their refutations. Phase 1 of the inoculation treatment is based on the assumption that, in general, most students demonstrate varying degrees of resistance to different types of persuasive pressures. Phase 2 proposes that, while students are learning about threatening arguments and practicing effective refutations, their level of resistance is high. Although such resistance may still fluctuate, it generally remains strong. Phase 3 illustrates the potential impact of a "sleeper effect" upon subjects following inoculation treatments. It is proposed that, with time, a person who has been inoculated against a threatening argument will come to think of even more refutations to these arguments. Research results suggest that the inoculation approach is compatible with the goals and objectives of preventive alcohol education. (JD)

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APPLICATION OF INOCULATION THEORY TO PREVENTIVE ALCOHOL EDUCATION

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APPLICATION OF INOCULATION THEORY TO PREVENTIVE ALCOHOL EDUCATION EFFORTS

INTRODUCTION

A variety of Health Education investigations in recent years have successfully utilized the "inoculation" or "immunization" approach toward preventing risky health behaviors[1-3]. This approach is based on the selective exposure postulate of Klapper[4]. This postulate states that individuals tend to defend their own position by avoiding exposure to opposing positions rather than developing positive supports for their position (p. 184). The inoculation procedure logically follows from this concept in that it pre-exposes people to threatening messages they are likely to encounter in the future. By familiarizing students with the threatening messages involved in a certain area, a resistance to the persuasive impact of these messages can be produced[5-6]. Recent efforts in the field of health behavior have applied this procedure in the area of preventive smoking education[7-8]. These studies have conferred upon experimental subjects a theoretical immunity to the threatening attacks or persuasive arguments involved in youthful smoking. Stated another way, these efforts have enabled the students to effectively resist pressures involved in cigarette smoking.

The concept of inoculating populations against a future threat, whether it be a disease or an "enemies" propaganda, is well established[19-21]. The marketing profession has long been engaged in this process. Various marketing studies have immunized their customers against the advertising claims of competitors[9]. The communications field has similarly researched the parameters and potentials of this concept[10]. The most extensive

research on applying Inoculation Theory stems from the field of Social Psychology, most notably the work of McGuire[5,6,11]. Numerous psychosocial investigations have demonstrated that resistance to specific opposing arguments can be increased if subjects are familiarized with the opposing arguments before actual contact[12-13].

While health behavior researchers have successfully utilized this approach in the area of preventive smoking education, there is a striking paucity of comparable research in the area of preventive alcohol education. The present study attempted to extend this concept into the area of preventive alcohol education. The purpose of the investigation was three-fold: (1) to test the efficacy of the inoculation technique within the context of preventive alcohol education; (2) evaluate the effectiveness of a unique variation of the theory and (3) propose theoretical mechanisms which may underlie the inoculation process in youthful populations.

Methodology

The study sample was comprised of 155 ninth grade students from a Nebraska High School. A Solomon Four-Group Design (Figure 1) was employed for the research.

The study instrument was developed after a review of the alcohol education literature and the completion of a two-week pilot program. Reliability was assessed at .90 via a test-retest format. A panel of experts in measurement and alcohol education deemed the instrument high in validity. Teachers were trained in a series of seminars conducted by the principal investigator.

Independent variable components consisted of: (a) film, (b) question-answer session, (c) role-play exercises and (d) a slide show

presentation. Each of these components familiarized students with both the physiologic effects of alcohol and the persuasive arguments people use to convince others to engage in risky alcohol-related practices (i.e., riding with drinking drivers). The role-play exercises in particular, taught students the content and aim of these persuasive arguments, gave them practice refuting such arguments and provided them with feedback on their refutations.

The dependent measure for the study was the ability to refute persuasive arguments involved in drinking and driving situations (i.e., resistance to pressure). The study instrument contained 9 such arguments. A score of 1 was given for a refutation and a 2 for a non-refutation. In this regard, the lower the mean score the greater the ability to refute. The criteria for awarding refutations were: (a) if the subjects response disagreed with the accuracy of the arguments main point or, (b) if the subjects response indicated the main point of the argument was irrelevant to the central issue (i.e., increased risk due to impairment by alcohol). Two external, independent judges scored these responses. The inter-rater reliability for these judges was .86 using a Pearson Correlation coefficient procedure.

The data analysis associated with the Solomon Four-Group Design consists of treating posttest scores with a 2 x 2 ANOVA[17,18]. The two main factors in this analysis being pretest and treatment (Figure 2). This analysis produces 3 F-values: one for the experimental treatments effect, one for the effect of pretesting and one for the interaction between treatment and pretest. Additionally, the use of the Solomon Design allows for an examination of both marginal and individual cell

means. By assessing marginal column means one can evaluate the effect of the experimental treatment. In analyzing marginal row means one can evaluate the effect of the pretest. Finally, by examining the individual cell means one can assess the extent of interaction between pretest and treatment.

Results

A major purpose of the study was to give students skill in resisting pressures involved in drinking and driving situations. For the present program, this necessitated having subjects demonstrate proficiency at refuting persuasive arguments in a hypothetical alcohol vignette. To this end the study results were encouraging.

Table 1 presents the results of the ANOVA carried out on these scores.

As is shown by the large F-value for treatment (114.72), a significant ($p < .01$) main effect was found. There was also a significant interaction ($p < .01$) between pretest and treatment, this is shown in Figure 3. Such an interaction was expected due to the fact that both pretest and treatment contained a similar component - that of hypothetical alcohol vignettes. Such interactions are portrayed graphically to depict their magnitude. As Figure 3 illustrates even though statistically significant the effect of the interaction was relatively minor.

Table 2 presents the individual cell means, standard deviations and marginal row and column means for each groups refutation scores. The marginal column means (11.62 and 14.81) reflect the strong main effect of the experimental treatment. The marginal row means (13.44, 13.16) do not differ significantly. This suggests that their was no

statistically significant pretest sensitization on the refutation scores.

Discussion

The present study utilized Inoculation Theory as a basis for teaching students how to effectively refute persuasive arguments involved in drinking and driving situations. Inoculation Theory proposes that among other variables, the ability to resist persuasive arguments is a function of knowing the content of such messages before actual contact with them. The results of the present investigation suggest that students can be taught how to resist the pressures involved in drinking and driving situations by learning the content of the opposing arguments and practicing refutations to them.

Figure 4 portrays the theoretical mechanisms underlying an inoculation treatment. Phase 1 suggests that in general most students demonstrate varying degrees of resistance to various types of persuasive pressures. For example, a student may accept a ride from a drinking driver because s(he) has been told by peers this driver has a "tolerance" to alcohol. This would illustrate a low level of resistance. Another individual may refuse a drink offer at a party because s(he) has to drive home. Such a refusal may be challenged by the persuasive argument: "at least have one drink - it will relax you". A student demonstrating high resistance may refute this argument by stating "I don't want alcohol to relax me". Such fluctuations in resistance to pressure are assumed to be a result of innumerable variables each student brings to a situation (i.e., experiences, parental training, personality traits).

A series of interviews with students and teachers from eight separate schools in Nebraska tended to support this explanation.

Phase 2 proposes that while students are learning the content of the threatening arguments, practicing effective refutations and receiving feedback on their responses to these pressures, their level of resistance is high. Although such resistance may still fluctuate it generally remains strong. The primary mechanism at work in this phase appears to be one of awareness. The subjects gain increased awareness of their positions vulnerability to attack during the actual inoculation. They are then given an effective defense of their position (i.e., refutations) and resistance to pressure increases. Peer and teacher support during the inoculation session also appear to be instrumental in maintaining high resistance.

Phase 3 illustrates the potential impact of a "sleeper effect" upon subjects following inoculation treatments. McGuire[11] has proposed that with time a person who has been immunized against a threatening argument will come to think of even more refutations to the threatening arguments. This process is referred to as "bolstering" and is analogous to the "booster" concept employed in education programs. The impact of such bolstering usually decays over time. The rate and duration of this decay as well as the variables causing it are not precisely known.

Researchers in the field of health behavior have suggested that without skill in resisting pressures students may be more susceptible to the persuasive influences of others[14-15]. The present trend toward educational immunization is strongly warranted for it provides students with a number of essential experiences: (1) exposure to new information, (2) opportunities to assess the differential validity of opposing/

threatening arguments, (3) opportunities to practice refuting these arguments and (4) opportunities for feedback and evaluation of their responses. This combination of learning experiences has been reported to be salient to numerous fields among them Health Education[16].

The current study inoculated subjects using four separate modalities: 1) film, 2) question/answer, 3) role playing and, 4) slide show. This is a variation of McGuire's earlier studies which immunized subjects against persuasive messages using one modality. Various reading and writing exercises were the adopted methods of immunization in those initial investigations. The outcomes of the present research suggest that the inoculation approach is compatible with the goals and objectives of preventive alcohol education. Results also indicate that the inoculation itself can be delivered over a longer period of time and in numerous modalities and still confer immunity or resistance. Other areas can benefit from the incorporation of the inoculation concept into their programs. Drug education, sexuality and safety all deal with persuasive arguments that can lead youth to engage in risky health practices. Educational immunization similar to biological immunization, can never offer a 100% effective and forever-lasting resistance to external threats. The present study did not emphasize or presuppose that such an immunity would be conferred. Instead, the present study attempted to assess the efficacy of inoculation in the alcohol education setting using a modification of the original process.

Finally, research of this nature can give students skill to manage pressures that may be health threatening. Whether or not such skill transfers to real-life encounters remains to be assessed. The current project has planned in conjunction with the study school a four-year

longitudinal evaluation of these skills and their related behavioral dynamics.

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Figure 1. The Solomon Four-Group Design

Experimental 1	(N = 38)	R	O_1	X	O_2
Control 1	(N = 46)	R	O_3		O_4
Experimental 2	(N = 35)	R		X	O_5
Control 2	(N = 36)	R			O_6

Where: O is a test administration
X is a treatment
R is random assignment of subjects

Figure 2. Two Main Factors in the Solomon Design

	No Treatment	Treatment
Pretested	O_4 (C_1)	O_2 (E_1)
Non-pretested	O_6 (C_2)	O_5 (E_2)

TABLE 1

Two by Two ANOVA for Refutation Scores

Source of Variation	Sum of Squares	Df	Mean Square	F value
Treatment	388.79	1	388.79	114.71**
Pretest	.87	1	.87	.26
Interaction	22.16	1	20.16	6.54**
Explained	413.96	3	137.98	40.72
Residual	511.72	151	3.38	----

**p<.01

Figure 3. Significant Two Way Interaction of Treatment and Pretest for Refutation Scores.

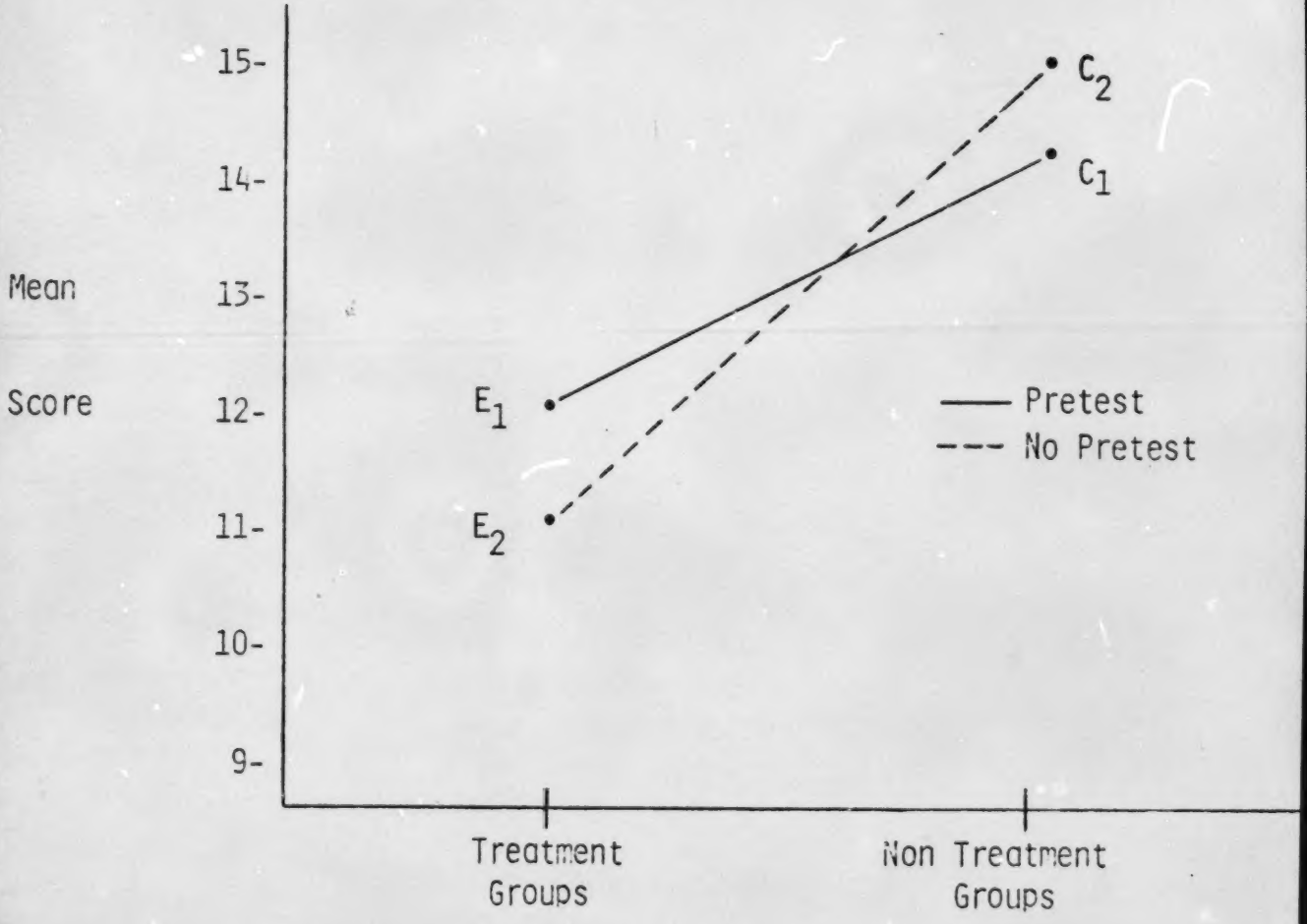
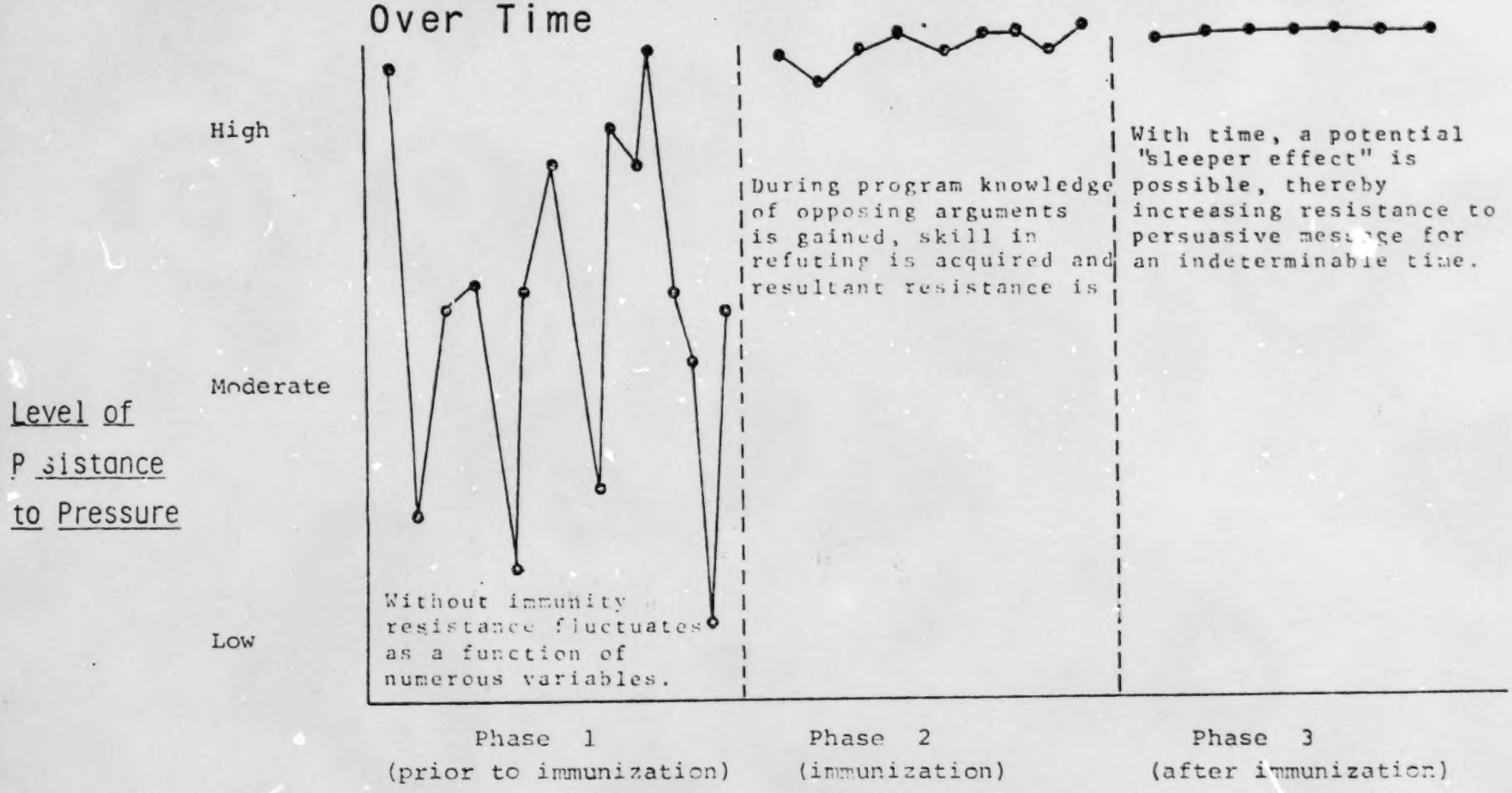


TABLE 2

Cell and Marginal Means for Refutation Scores

	Treatment	No Treatment	
Pretest	(E_1) M= 12.08 SD= 1.79 N= 38	(C_1) M = 14.55 SD = 1.97 N = 46	M = 13.44
No Pretest	(E_2) M= 11.13 SD= 1.69 N= 35	(C_2) M = 15.13 SD = 1.84 N = 36	M = 13.16
	M = 11.62	M = 14.81	

FIGURE 4. The Theoretical Mechanics of Inoculation Over Time



- Indicates one individual encounter involving a pressure.